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Instruments used for inserting a hip cup

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(71) Applicant(s)  
Waldemar Link GmbH & Co. KG

(72) Inventor(s)  
Rizkallah, Sherif M.; Keller, Arnold; Chung, Wui K.

(74) Agent/Attorney  
Griffith Hack, Level 29 Northpoint Tower 100 Miller Street,  
North Sydney, NSW, 2060

(56) Related Art  
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W01997/047257

# ABSTRACT

An instrument set for inserting an acetabular prosthesis with at least one shaped acetabular part (50) and a shaft (55) which is to be connected axially thereto and which at one end has a coupling element (54) which is to be connected to a corresponding coupling element (53) on the shaped acetabular part (52). To ensure that the coupling elements (53, 54) can be easily guided toward one another in a confined operating site, the coupling element (53) on the shaped acetabular part (52) is surrounded by a funnel-shaped guide surface (43) guiding the shaft end toward it.

**INSTRUMENTS USED FOR INSERTING A HIP CUP**

Hip-joint prostheses consist of a prosthetic part replacing the femoral head, and of a prosthetic socket replacing the slide surface of the natural acetabulum. The invention relates to the insertion of the prosthetic socket.

Before a prosthetic socket can be inserted into the natural acetabulum, the latter must be worked in advance by means of a reamer head to adapt it to the particular prosthetic socket. This work and the insertion of the prosthetic socket naturally take place from the open side of the acetabulum. The direction in which the acetabulum opens and which is defined by the course of its margin, is referred to below as the axial direction of the acetabulum. This is generally also the direction in which the physician orients the axial direction of the reamer when reaming the acetabulum and in which he then introduces the prosthetic socket. For this work, when using traditional operating techniques, the operating surgeon requires a relatively widely open operating field. It must be at least as wide as to permit introduction of the prosthetic socket, the 30 reamer head, and an instrument extending approximately in the axial direction of the acetabulum. The conventional operating technique accordingly requires that the covering tissue is opened widely in the direction of the axis of the acetabulum.

An instrument set is known (W097/47257) with which it is possible to use, instead of one large opening situated approximately in the axial direction, two small operating openings, of which a first opening situated transverse to the axial direction of the acetabulum is used for inserting the reamer head and the prosthetic socket, that

is to say those parts which have a greater diameter and are needed directly on the joint socket. They are referred to below as shaped acetabular parts. A second opening situated in the axial direction serves solely for

5 insertion of the instrument shafts and can accordingly be very small. The connection between the shafts and the shaped acetabular parts, which is necessary to permit functioning, is, effected only after both parts have been inserted into the operating site near the natural  
10 acetabulum. By virtue of the decreased size of the surgical wounds, the stress imposed on the patient is reduced.

In the known apparatus, a supporting and guiding part is provided for the instruments, which part at one end  
15 forms a guide for an instrument shaft which is guided to the acetabulum through a bore in the femoral neck. Provided at the other end of the support part there is a mounting for support arms on which the shaped acetabular parts are secured. This is intended to help guide the  
20 shafts and the associated shaped acetabular parts into the same operating field through different operating openings and to position them there on the same axes in such a way that they can be coupled to each other. However, this object is not achieved with the known apparatus. Instead,  
25 the experienced operating surgeon feels: rather at a disadvantage because it is not possible for him to position the shaped acetabular parts in the way which his feeling for the anatomy dictates.

30 Summary of the Invention

It would be advantageous if the present invention would provide an instrument set which gives the operating surgeon greater freedom of access and yet permits easier

coupling of the shafts to the shaped acetabular parts. The present invention provides an instrument set for use in inserting a prosthesis into an acetabulum, the instrument set comprising:

5       one or more shaped acetabular parts;  
      a shaft having an elongate axis and, at one end, a coupling element such that the shaft can be axially connected to a corresponding coupling element in each of the acetabular parts; and,

10       a grip part for releasably coupling with a respective one of the acetabular parts such that, when coupled, the grip part extends substantially transversely to the axial direction of the acetabulum,

      wherein the each of the acetabular parts is provided  
15       with a funnel shaped guide surface surrounding the corresponding coupling element such that the end of the shaft provided with the coupling element is guided towards the corresponding coupling element as the shaft is moved towards the respective acetabular part.

20       When the operating surgeon holds the shaped acetabular part in the operating field and pushes the shaft toward it, the front end of the shaft may meet the guide surface, which would allow him to guide the coupling elements of both parts toward one another. This is easier for him to do than would  
25       be the case if he had at the same time to concentrate also on the characteristics of a support part influencing the position of the two parts.

      The coupling element on the shaped acetabular part may be a bore which may, if appropriate, be equipped with  
30       additional connection arrangements, for example a thread or bayonet catches. The coupling element of the shaft may then be formed by the pin-shaped end of the shaft which is inserted into the bore and which, if appropriate, is equipped with complementary connection arrangements.

35       To manoeuvre the shaped acetabular parts, a grip part may be provided which can be releasably connected in each case to a shaped acetabular part. By means of this grip part, the shaped acetabular part may be inserted and may be oriented and held in such a way that the shaft introduced  
40       through the other operating opening can be

coupled to it. As soon as this coupling has been effected, the grip part may be released, because the position and orientation of the shaped acetabular part may be now be determined by the shaft. The shaped acetabular part may be  
5 manoeuvred by means of the shaft. This manoeuvring is intended to include the movement or orientation of the shaped acetabular part in relation to the natural conditions, for example the rotation of a reamer head for working the acetabulum, or the orientation and implanting  
10 of a prosthetic socket.

In the case of a reamer head, the coupling section and the guide surface may be arranged directly thereon. For prosthetic sockets and their parts, this possibility is not always available. An extensive guide surface will  
15 rarely be possible on these. In addition, it is often not possible or desirable to provide a coupling section. An embodiment of the present invention therefore proposes a special socket support part which supports the coupling section and if appropriate the guide surface and has  
20 connection devices which cooperate with the prosthetic socket and engage particularly on its edge. These connection devices may not have to be arranged, or entirely arranged, on the support part; they may also be formed at least partially by the grip part which may be  
25 used for introducing the prosthetic socket and the support part.

Embodiments of the invention are explained in greater detail below with reference to the drawings which depict an advantageous illustrative embodiment, and in which:

30 Fig. 1 shows a diagrammatic view through the operating field,

Fig. 2 shows the state after resection of the femoral head,

Fig. 3 shows the insertion of an acetabulum rasp,  
Fig. 4 shows the insertion of an acetabular fixture,  
Fig. 5 shows the state after provisional positioning  
of the acetabular fixture,

5 Fig. 6 shows an alternative instrument design to  
Figures 4 and 5,

Fig. 7 shows the connection of the instrument  
according to Fig. 4 to a grip part,

Fig. 8 shows a side view of the parts according 35 to  
10 Fig. 7,

Fig. 9 shows the insertion of an impaction instrument  
for the socket fixture,

Fig. 10 shows the insertion of a socket lining.

15 Detailed Description of Preferred Embodiments of the  
Invention

As is known, the pelvic bone 1 forms the hip socket  
2, the so-called acetabulum, with an articular surface for  
the femoral head 3 which via the femoral neck 4 forms the  
20 proximal end of the femur 5. Covering tissue 7 is situated  
between the body surface (skin) 6 and the joint. The  
margins 8 of the natural acetabulum 2 form an opening  
which defines a direction of opening, which is indicated  
as the axial direction of the acetabulum by the  
25 dot-and-dash line 9. In the standing position, the femoral  
neck 4 has approximately this same direction.

If the femoral head 3 and the surface of the  
acetabulum 2 are to be replaced by prosthetic parts, the  
femoral head 3 is resected along a first cut 25 extending  
30 in the direction of the dot-and-dash line 10 and removed,  
which cut 25 extends essentially perpendicular to the  
direction 9.

To provide access for the abovementioned instrument shafts, a second cut is made in the direction 9, and a sighting device 15 is then placed on the femoral bone, for example in the manner illustrated in Figure 2. This device  
5 consists of a frame 16 and of an adjustable carriage 17. At its end, the frame 16 has a first sighting bore 19 located in an angled-off part 18. In addition, projections 20 can be provided to ensure a secure fit on the resection surface 21 of the bone. On the slide carriage 17, which  
10 can be moved in the longitudinal direction of the frame 16 and can be fixed in the desired position by means of a screw 22, there is a second sighting bore 23 which is flush with the bore 19. Projections 24 can also be provided on the adjustable carriage 17 to permit better  
15 fixing of the device on the bone.

In the form shown, the device is designed as a jig. Instead of this, or in addition, it can also be designed for insertion of a guide wire for a hollow drill. This technique is known.

20 The device 15 is used to drill a bore 30 in the femoral bone, which bore 30 corresponds essentially to the axial direction 9 of the acetabulum with the leg in the release position. The bore 30 starts in the intertrochanter area and should open out approximately at  
25 the centre of the resection surface 21, so that subsequently the cavity for receiving the femoral prosthesis part can be formed in the femoral bone from this bore. The instrument shafts have approximately coaxial access to the acetabulum 2 through this bore.

30 The next stage involves preparing the acetabulum 2 to receive the prosthetic socket. This is done by means of a reamer head 35 which consists of a conventionally designed reamer head cup 36 and a support part 37 which is securely



connected to the edge of the reamer cup 36 and at the centre has a bore 38 provided with radial bayonet projections 39. This forms the reamer-side coupling element.

5       At the end of the shaft 40, bayonet grooves 42 matching the projections 39 are provided in a section 41 matching the bore 38. When the end of the shaft 40 is inserted into the bore 38 and turned in the direction of the reaming movement, the coupling sections engage with  
10 one another. The insertion of the section 41 into the bore 38 is made easier by the fact that the bore 38 is surrounded by a funnel surface 43 which guides toward it.

      In order to hold the reamer head 36 while it is being guided to the acetabulum and connected there to the shaft,  
15 it is connected to a grip part 45 which can be easily released as soon as the reamer head 35 and the shaft 40 are coupled together.

      The operating surgeon can set the reaming direction substantially freely, either by making the bore 30 in the  
20 femoral bone wide enough to permit pivot movements and movements transverse to the shaft axis, or by positioning the patient's leg accordingly.

      After the acetabulum 2 has been reamed out, the reamer head 35 is lifted from the acetabulum by means of  
25 the shaft 40. The reamer head is then released from the shaft and can be removed again through the first opening 25. To do this, the grip part 45 can be used again or any other instrument.

      In some cases it is desirable to rework the resection  
30 surface 21 (DE-A-3216533). A reamer head (not shown) is then used whose reamer surface is directed toward the resection surface 21 and likewise has a coupling bore 38 for connection to the shaft 40. The guiding of the shaft

40 in the bore 30 then ensures that the reworked resection surface 21 has the desired orientation relative to the bore 30. If this bore, by virtue of the sighting device 15, has the same direction relative to the bone in which the shaft of the femoral prosthesis part is subsequently to emerge from the resection surface 21, this therefore also ensures a correct orientation of the resection surface in relation to this prosthesis part.

After the reaming work has been completed, the socket fixture 50 is inserted through the operating opening 25 by means of the grip part 45. In the example illustrated, this is a prosthetic cup which is to be anchored in the acetabulum 2 and will in turn receive a socket lining 51 (see Fig. 10), for example of polyethylene.

A support part 52 is releasably connected to the socket fixture 50 in a manner which will be explained below and, like the holder 37 of the reamer head 35, it has a funnel-shaped guide surface 43 and a bore 53 as coupling element, which is provided with a thread for connection to the coupling element 54 which is arranged at the end of the shaft 55 and has a corresponding thread. When the support part 52 and the socket fixture 50 are connected to the shaft 55, the grip 45 can be released. However, this is not absolutely necessary as long as the grip does not engage on the socket fixture 50 but on the support part 52.

By means of the shaft 55, the socket fixture 50 is now pushed into the acetabulum 2 in the desired direction (Fig. 5). The socket support part 52 is then released from the socket fixture 50 and lifted out of the socket fixture 50 by means of the shaft 55. It can then be released from the shaft 55 and be removed from the operating site through the operating opening 25 by means of the grip 45

or another suitable instrument. Fig. 7 shows an illustrative embodiment, on an enlarged scale, of the grip part 5 and of its cooperation with a socket fixture 50 and the associated support part 52. In this embodiment, the

5 grip part 5 is a U-shaped frame whose branches 45 end in hooks 70 pointing outward in opposite directions. The support part 52 has two diametrically arranged and flush bores 71 through which the hooks 70 engage in the assembled state of the grip part 5. The socket fixture 50 has a

10 circular groove 72 which is intended, for example, to subsequently receive a catch element of the socket insert 51. Situated at the ends of the hooks 70 there are projections 73 which engage in the groove 72 in the assembled state of the grip part 5 as illustrated. By this

15 means, not only is the grip part 5 connected to the support part 52, but it is also securely connected to the socket fixture 50.

The branches 45 of the frame 5 are connected to each other by a spreader device 74 which consists of two threaded

20 pins 75, with threads running in opposite 25 directions, and of a matching threaded sleeve 76. If the threaded sleeve 76 is turned in one direction, the branches are spread apart. If it is turned in the other direction, the branches are pulled together. Fig. 7 shows the branches in the spread

25 state, in which the grip part is securely connected to the support part 52 and to the socket fixture 50. If the support part 52 is to be released from the socket fixture 50, the branches 45 of the grip part 5 are drawn slightly together by turning the threaded sleeve so that the

30 projections 73 are released from the groove 72, but with the hooks 70 still located in the bores 71 of the support part. The latter can now be detached with the grip part. Upon further pulling together of the grip branches 45, the grip can also be detached

from the support part. The reverse procedure is followed for connecting these parts.

For the sake of simplicity, the grip part 5 in Fig. 7 is shown as if extending approximately in the direction of the axis 77. In reality, however, it extends transverse to this axis, as can be seen from Fig. 8.

Whereas the coupling element 54 in the embodiment according to Figures 4 and 5 engages exclusively on the support part 52, Fig. 6 shows an alternative embodiment which is used in particular when the socket fixture 50 is provided on the base with a threaded bore 53'. The support part 52 then has, instead of the threaded bore 53, only one through-bore 53''. The shaft 55 sits with a flange 56 on the surface surrounding the bore 53" and transfers to this location the force necessary for ramming the socket fixture 50 into the acetabulum.

If the physician doubts whether a sufficiently secure fit of the prosthetic cup 50 in the acetabulum 2 has been obtained using the instrument shown in Figures 4 to 8, he can push it in further using the instrument shown in Fig. 9. The instrument consists of a shaft 58 and a ramming head 59 which is arranged on a grip (not shown) and has a receiving bore 60 for the cylindrical end of the shaft 58. The bore 60 is surrounded by a guide surface 61 which in this example has a slightly different funnel shape than that shown in Figures 3 and 4. It encloses with its centre line (axial direction 9 of the acetabulum) an angle which becomes smaller toward the centre, so that the guide effect becomes ever greater the closer the end of the shaft 58 approaches the bore 60. The ramming head 59 has a spherical outer shape matching the inner shape of the socket fixture 50. It can therefore drive the latter into the acetabulum 2 without risk of deformation. The shaft 58

can then be simply withdrawn from the ramming head 59 and the latter can be removed from the operating site.

According to Figure 10, the socket insert 51 can be inserted into the socket fixture 50 in a corresponding manner. The insert 51 is provided for example with a catch device which holds it securely in the socket fixture (example: WO 99 60 955). Therefore, to fit the insert, all that needs to be done is to push it into the socket fixture in the axial direction of the acetabulum.

10 This is done by means of a shaft 55 which at the front end (as is explained in connection with Figure 4) has a threaded section 54 and can be connected to a ramming head 65 which has a corresponding threaded bore 66 and a guide surface 67 surrounding the latter. The  
15 ramming head 65 has a projecting collar 68 which can cooperate with the edge of the socket insert 51 in order to set it exactly to the socket direction. This is not absolutely necessary if the insert itself is also provided with a projecting collar 69 which bears on the edge of the  
20 prosthetic cup 50 and is thereby oriented with the latter.

The ramming head 65 is connected to a grip rod 80. For example, it is screwed to the latter in a releasable manner at 81. In order to hold the socket insert 51 securely on the ramming head before it is anchored safely  
25 in the socket fixture 50, the grip rod 80 is surrounded by a fixing tube 82 which has an edge 83 at the end toward the ramming head and is connected to the grip rod 80 via a thread 84. By turning the fixing tube, it can be screwed forward and backward relative to the grip rod in order to  
30 hold the socket insert 51 on the ramming head 65 in one end position by means of the edge 83, or to release it in a drawn-back position.

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After the insert 51 has snapped into place in the cup 50, the ramming head 65 can be withdrawn with the shaft 55, released from the latter and removed from the operating site through the operating opening 25.

5 A reference herein to a prior art document is not an admission that the document forms part of the common general knowledge in the art in Australia.

10 In the statement of invention and description of the invention which follow, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various  
15 embodiments of the invention.

Kirstie/keep/retyp/P47791 retype & claims 29/09/2005

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An instrument set for use in inserting a prosthesis into an acetabulum, the instrument set comprising:
  - 5 one or more shaped acetabular parts;
  - a shaft having an elongate axis and, at one end, a coupling element such that the shaft can be axially connected to a corresponding coupling element in each of the acetabular parts; and
  - 10 a grip part for releasably coupling with a respective one of the acetabular parts such that, when coupled, the grip part extends substantially transversely to the axial direction of the acetabulum,
  - wherein the each of the acetabular parts is provided
  - 15 with a funnel shaped guide surface surrounding the corresponding coupling element such that the end of the shaft provided with the coupling element is guided towards the corresponding coupling element as the shaft is moved towards the respective acetabular part.
  - 20
2. An instrument set as claimed in claim 1, wherein the corresponding coupling element on the at least one shaped acetabular part includes a bore.
- 25 3. An instrument set as claimed in either claim 1 or 2, wherein one of the acetabular parts comprises a part of a prosthetic socket, and the guide surface is arranged on a socket support part having connection devices that cooperate with the prosthetic socket, and wherein the grip
- 30 part can be connected to the socket support part.
4. An instrument set as claimed in either claim 1 or 2, wherein one of the acetabular parts comprises a part of a prosthetic socket, and the guide surface is arranged on a
- 35 socket support part having connection devices that cooperate with the prosthetic socket, and wherein the grip part is connected to the socket support part.

5. An instrument set as claimed in either claim 3 or 4,  
wherein a part of the connection devices are provided on  
an edge of the prosthetic socket.
- 5 6. An instrument set as claimed in any one of claims 3  
to 5, wherein a part of the connection devices are  
provided on the grip part.
- 10 7. An instrument set as claimed in claim 6, wherein the  
grip part comprises a frame, and the part of the  
connection devices disposed on the grip part are two  
opposing hooks that are disposed at an end of the frame.
- 15 8. An instrument set as claimed in claim 7, wherein each  
of the acetabular parts has a pair of complementary bores,  
each bore for receiving one of the hooks of the grip part.
- 20 9. An instrument set for use in inserting a prosthesis  
into an acetabulum substantially as herein described with  
reference to the accompanying drawings.

25 Dated this 29th day of September 2005

WALDEMAR LINK (GMBH & CO)  
By Its Patent Attorneys  
GRIFFITH HACK

30 Fellows Institute of Patent and Trade Mark  
Attorneys of Australia.



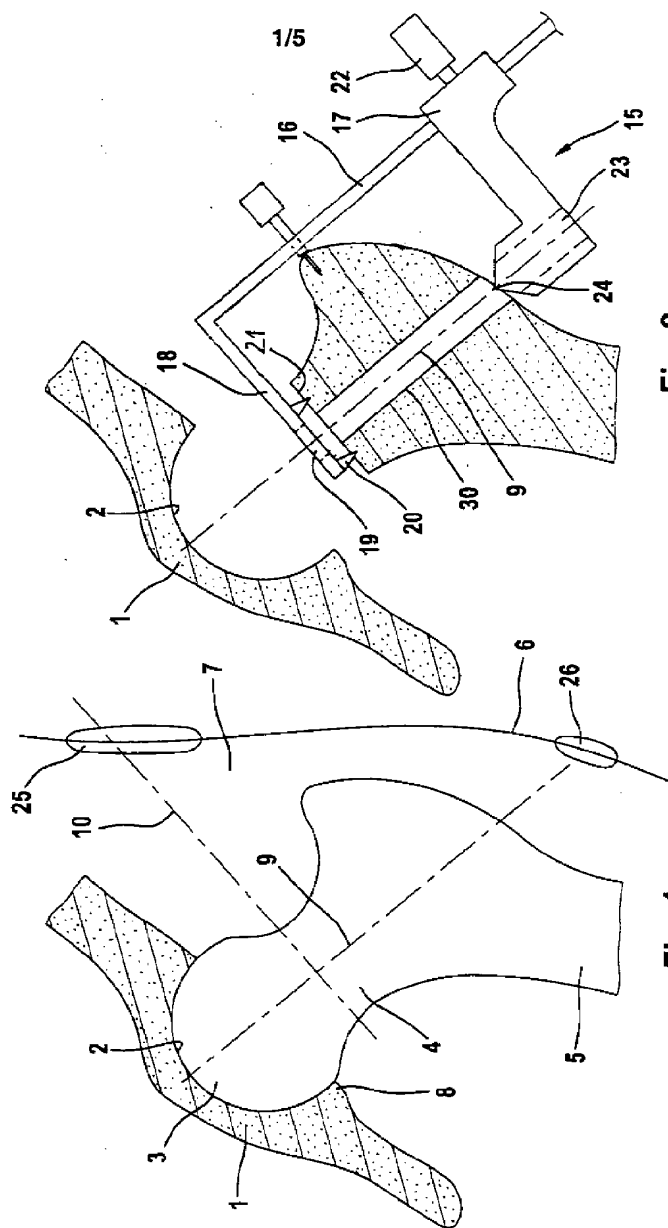
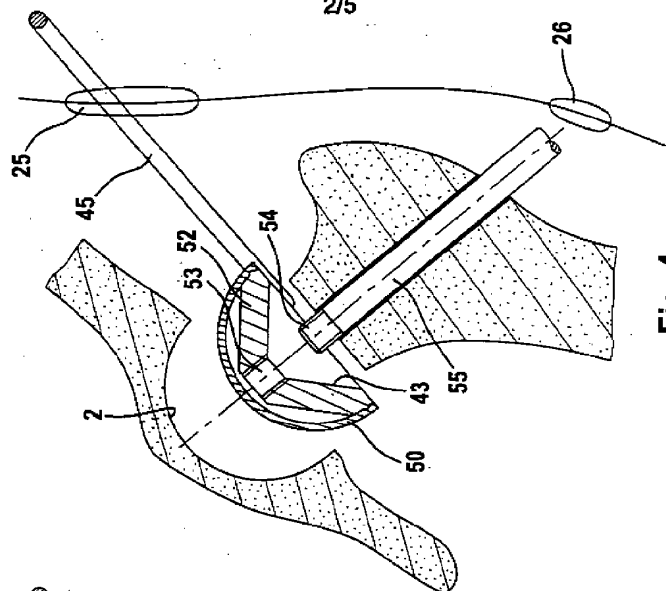
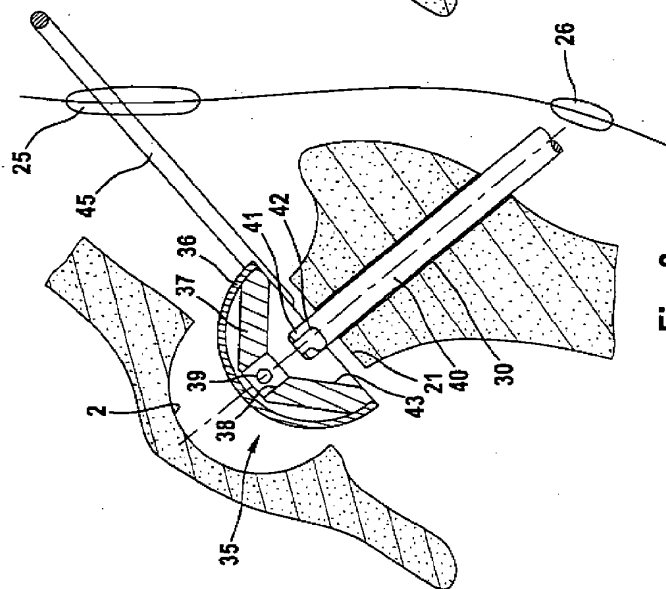


Fig. 2

Fig. 1



**Fig. 4**



**Fig. 3**

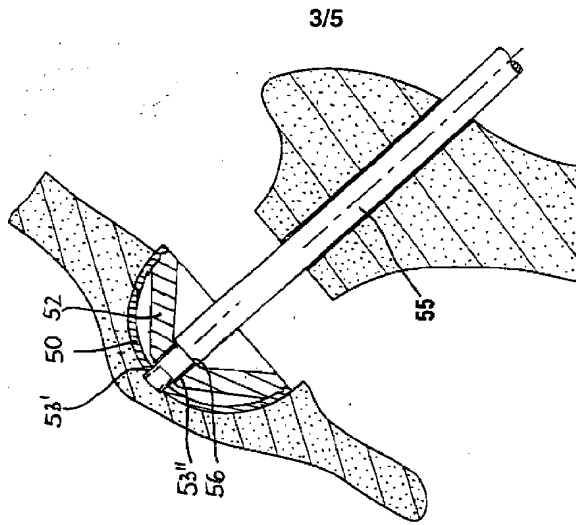


Fig. 6

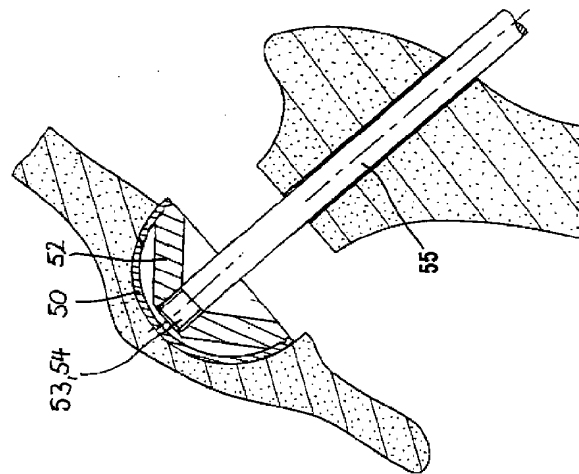
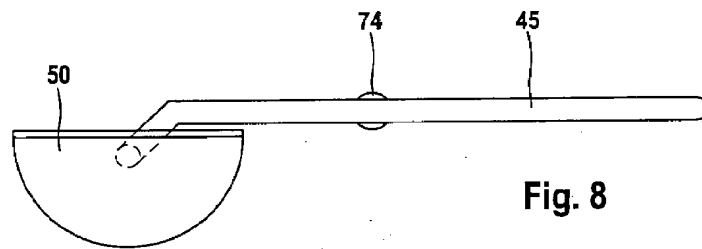
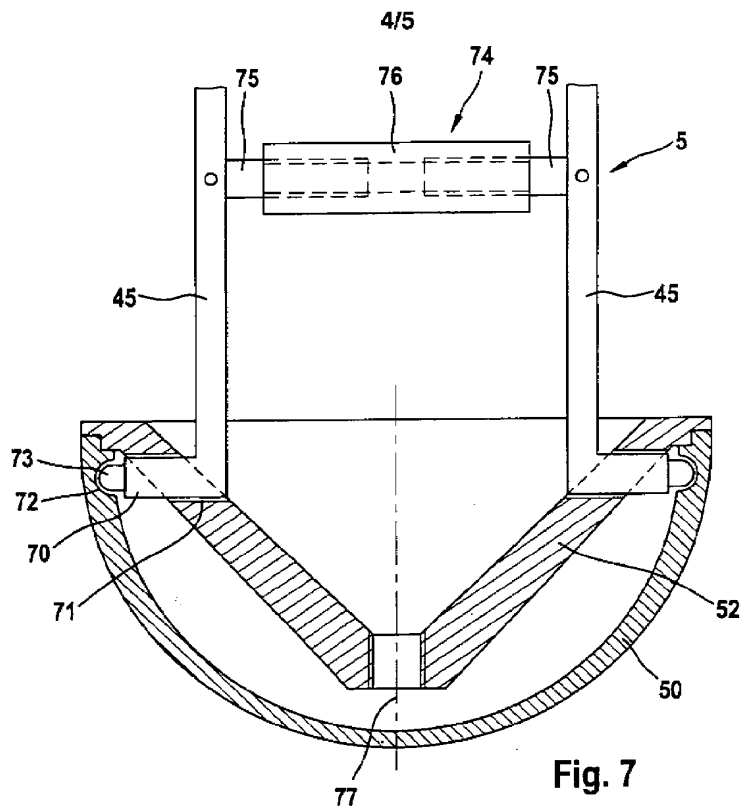


Fig. 5



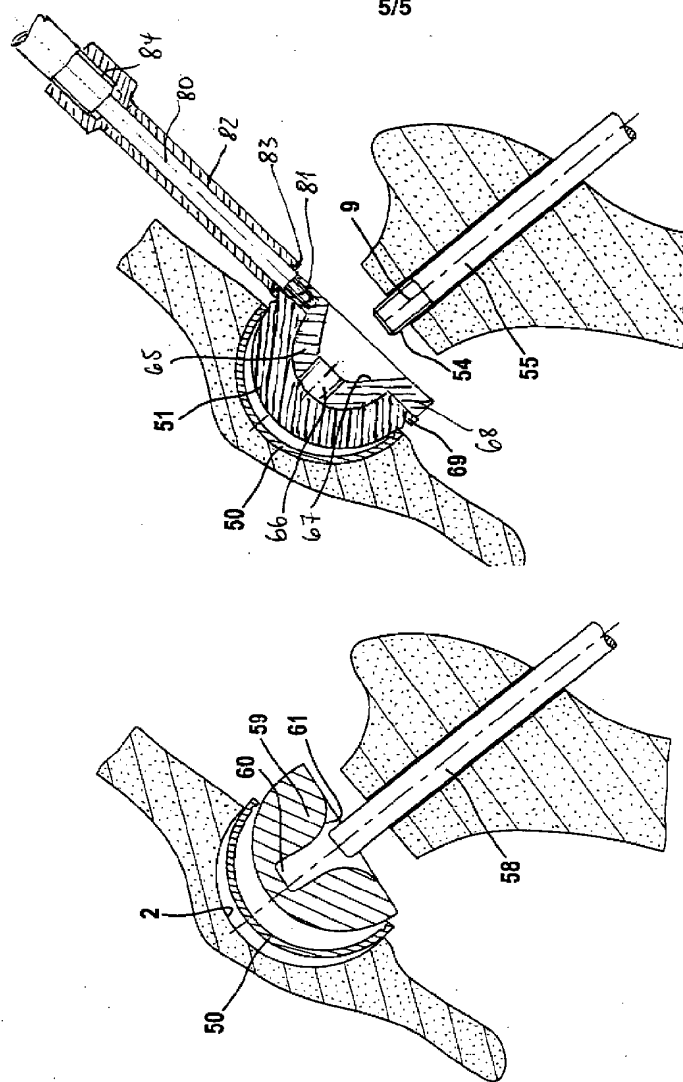


Fig. 9

Fig. 10

IN THE MATTER OF an Australian  
Application corresponding to  
PCT Application PCT/EP01/05821

I, David Brook BAXTER MA,  
translator to RWS Group plc, of Europa House, Marsham Way, Gerrards Cross,  
Buckinghamshire, England, do solemnly and sincerely declare that I am conversant with the  
English and German languages and am a competent translator thereof, and that to the best of  
my knowledge and belief the following is a true and correct translation of the amended sheets  
of the PCT Application filed under No. PCT/EP01/05821.

Date: 11 October 2002



D. B. BAXTER

For and on behalf of RWS Group plc

## Patent Claims

1. Instruments used for inserting a hip cup,  
comprising at least one molded socket part (35,  
50, 52, 59, 65) and a shaft (40, 55, 58) which is  
to be axially connected to the latter and which at  
the end has a coupling element (41, 54) which is  
to be connected to a corresponding coupling  
element (38, 53, 60, 66) on the molded socket part  
(35, 50, 52, 59, 65), and comprising a grip part  
(45) which can be connected releasably to the  
molded socket part (35, 50, 52, 59, 65)  
transversely with respect to the axial direction  
(9) of the socket, characterized in that the grip  
part (45) is not influenced by the position of the  
shaft (40, 55, 58), and the coupling element (38,  
53, 60, 66) on the molded socket part (35, 50, 52,  
59, 65) is surrounded by a guide surface (43, 61,  
67) which leads the shaft end toward it.
2. Instruments used for inserting a hip cup,  
comprising at least one molded socket part (35,  
50, 52, 59, 65) and a shaft (40, 55, 58) which is  
to be axially connected to the latter and which at  
the end has a coupling element (41, 54) which is  
to be connected to a corresponding coupling  
element (38, 53, 60, 66) on the molded socket part  
(35, 50, 52, 59, 65), and comprising a grip part  
(45) which can be connected releasably to the  
molded socket part (35, 50, 52, 59, 65)  
transversely with respect to the axial direction  
(9) of the socket, in particular as claimed in  
claim 1, characterized in that the guide surface  
(43, 61, 67) is funnel-shaped.
3. The instruments as claimed in claim 1 or 2,  
characterized in that the coupling element on the

AMENDED SHEET

molded socket part (35, 50, 52, 59, 65) is a bore (38, 53, 60, 66).

- 5        4.    The instruments as claimed in one of claims 1 to  
         3, characterized in that the molded socket part is  
         a part of a socket prosthesis (50), and the guide  
         surface is arranged on a socket support part (52)  
         which has connection devices (72, 73) cooperating  
10        with the molded socket part (50) and which is or  
         can be connected to the grip part.
5.    The instruments as claimed in claim 4,  
         characterized in that the connection devices  
         cooperate with the edge of the socket prosthesis  
15        (50).
6.    The instruments as claimed in claim 4 or 5,  
         characterized in that the connection devices (72,  
         73) are formed at least partially by the grip part  
20        (45).

AMENDED SHEET



## INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/EP 01/05821A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61F2/46 A61B17/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A61F A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 47257 A (MOSSERI) 18 December 1997 (1997-12-18) cited in the application the whole document	1,3-7
Y	US 2 785 673 A (ANDERSON) 19 March 1957 (1957-03-19) column 7, line 31 -column 8, line 20; figures 15,16,18-20	1,3-7
A	US 5 571 111 A (ABOCZKY) 5 November 1996 (1996-11-05) the whole document	1,3,5
A	US 5 462 548 A (PAPPAS) 31 October 1995 (1995-10-31) the whole document	1,3
-/-		

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

30 July 2001

Date of mailing of the international search report

07/08/2001

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Fax (+31-70) 340-3015

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Form PCT/ISA/210 (second sheet) (July 1992)

## INTERNATIONAL SEARCH REPORT

In  
PCT/EP 01/05821

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/EP 01/05821

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Internationales Aktenzeichen

PLI/EP 01/05821

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES  
IPK 7 A61F2/46 A61B17/16

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

Recherchierte Mindestprüfstoß (Klassifikationssystem und Klassifikationssymbole)

IPK 7 A61F A61B

Recherchierte aber nicht zum Mindestprüfstoß gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

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☒ Siehe Anhang Patentfamilie

\* Besondere Kategorien von angegebenen Veröffentlichungen

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\*Z\* Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche

30. Juli 2001

Abschließdatum des internationalen Recherchenberichts

07/08/2001

Name und Postanschrift der Internationalen Recherchenbehörde  
Europäisches Patentamt, P.B. 5818 Patentlaan 2  
NL - 2200 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Bevollmächtigter Beauftragter

KLEIN, C

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